

## **II. HOPI TRIBE AND NAVAJO NATION**

### **Hopi Tribe**

The Hopi Reservation is located in northeastern Arizona within Navajo and Coconino Counties. Reservation lands are primarily high desert dominated by three mesas ranging in E from 5,000 to 6,500 feet. Relatively dense population and a cultural center are located on these three natural features, with most of the 34 clans living in 12 villages on or near these mesas. The Reservation covers 1,560,993 acres. The land is suitable for grazing with the potential for expanded agricultural development. The Hopi people have practiced agriculture for hundreds of years despite an arid landscape and only 12 inches of annual rainfall.

Significant issues on the Reservations include high unemployment rates and lack of adequate supplies of safe drinking water. The main source of water is from groundwater and is principally used for domestic purposes. At the present time, the water levels of the aquifer are declining which is a cause of concern.

### **Navajo Nation**

The Navajo Reservation was established in 1868, and it expanded through a series of executive orders to become the largest Indian Reservation in the United States. The Navajo Nation covers an area of approximately 27,000 square miles including portions of Arizona, New Mexico and Utah. The Navajo Nation is divided into 110 chapters, which are areas of local government.

Significant issues on the Reservation include high unemployment rates and lack of adequate supplies of safe drinking water. Approximately 40 percent of the population on the western portion of Navajo Reservation haul water a distance of seven to ten miles. The main source of water on the western portion of the Navajo Reservation is the “N” aquifer. Presently, water is withdrawn for domestic use and for use in a coal slurry pipeline for the Peabody Coal Mine. At the present time, the water levels of the aquifer are declining which is a cause of concern.

Federally funded programs (including the Bureau of Indian Affairs, Indian Health Services, Tribal Government and the public schools) represent almost half of the employment on the Navajo Nation and Hopi Tribe Reservations combined. Other economic activities include cattle production, tourism, royalties from coal mining and construction.

### **II.A. Proposed Allocations**

Neither the Hopi Tribe nor the Navajo Nation currently have an existing CAP allocation. Under Non-Settlement Alternative 2 and Non-Settlement Alternative 3, the Hopi Tribe and Navajo Nation would receive a combined allocation of CAP water that would total 13,500 afa of M&I priority water. Pursuant to the Boulder Canyon Project Act of 1928 (PL 70-642), CAP water received as a result of this project would have to be used within the Lower Colorado River Basin. The following table summarizes the proposed allocations under each alternative.

<b>Table L-Indian-9</b> <b>CAP Allocation Draft EIS</b> <b>Navajo Nation and Hopi Tribe</b> <b>Combined CAP Allocations</b> <b>(in afa)</b>					
	<b>Alternative</b>				
<b>Combined CAP Allocation</b>	<b>No Action</b>	<b>Settlement Alternative</b>	<b>Non Settlement Alternative 1</b>	<b>Non Settlement Alternative 2</b>	<b>Non Settlement Alternative 3</b>
Existing	0	0	0	0	0
Proposed	0	0	0	13,500	13,500
Total	0	0	0	13,500	13,500
<u>Note:</u> All of the 13,500 afa CAP allocation considered is M&I priority.					

## II.B. Non-Binding Plans to Take and Use CAP

In response to a letter from Reclamation soliciting information regarding non-binding plans to take and use CAP water, letters were received from the Navajo Nation (December 29, 1999) and Hopi Tribe (December 30, 1999). Each letter described the Tribes' potential uses for CAP water that could be allocated under the draft EIS alternatives. Plans presented in this section were developed based upon information provided in those letters, as well as discussions with Reclamation staff. They are speculative in nature and are presented merely to provide a basis for comparing the potential extent of impacts that could occur across the range of alternatives.

The division of water between the Navajo Nation and Hopi Tribe is under negotiation as part of the on-going settlement agreement for the resolution of Indian water rights claims in the Little Colorado River watershed, pursuant to the Little Colorado General Stream Adjudication. Nothing has been finalized; therefore, no attempt is made in this document to speculate as to what the division might be, and the allocations are treated as one combined allocation for purposes of this evaluation.

### II.B.1. Uses

Uses for purposes of this analysis, it is assumed all of the 13,500 afa allocation would be used for M&I purposes, most likely in conjunction with or complementary to water uses that are being considered as part of other ongoing settlement negotiations. These include providing a renewable surface water source for use by Peabody Western Coal Company's Black Mesa Mine coal slurryline operation<sup>2</sup>, providing a reliable potable water supply for residents who currently are without one, supporting future population growth, and stimulating economic development.

<sup>2</sup>Currently, the mine and slurry operations are served by groundwater pumping under an agreement with the Hopi Tribe. If Peabody Western Coal Company elects to participate in the proposed Lake Powell Pipeline Project, it is currently envisioned approximately 4,000 afa would be used by the slurryline operation for the life of the Black Mesa Mine, estimated to close sometime from 2027 to 2032. After the mine closes, the water would shift to M&I use by Navajo and Hopi Communities.

For purposes of this analysis, it is anticipated the total estimated population from both entities that could be served by CAP water obtained through this project would be about 75,000 members by the year 2040. Currently, the populations in these areas are served mainly by groundwater.

Potential areas where the CAP water could be used, which would need to be located in the Lower Colorado River Basin, are shown in Figure L-IND-4.

Table L-Indian-10 summarizes the non-binding CAP allocation uses of the Navajo Nation and Hopi Tribe.

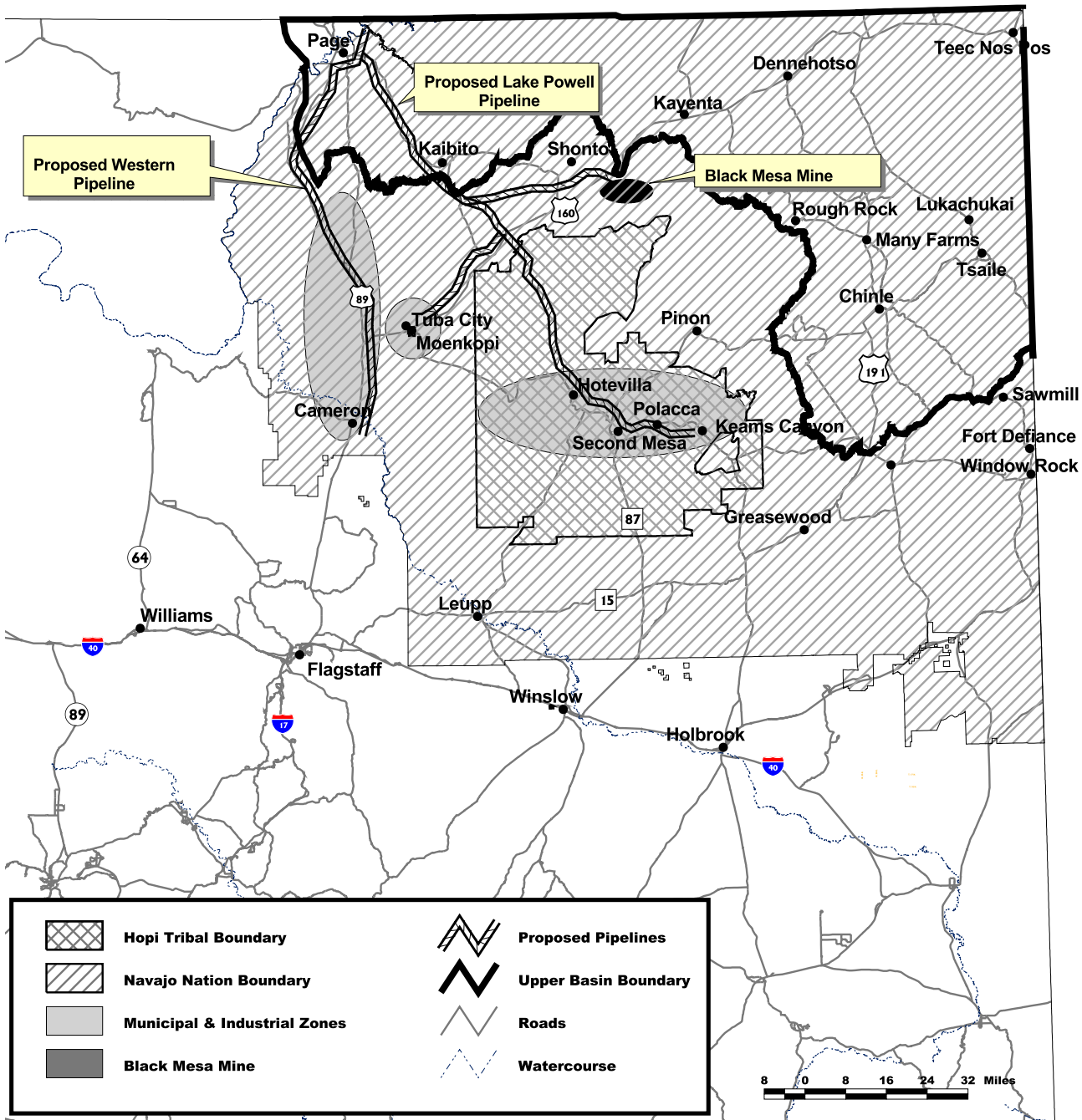
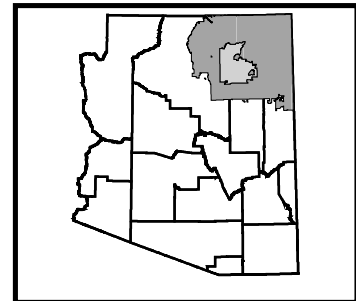
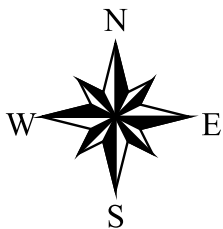
<b>Table L-Indian-10</b> <b>CAP Allocation Draft EIS</b> <b>Navajo Nation and Hopi Tribe</b> <b>Combined Total CAP Allocations</b> <b>Potential Non-Binding End Uses of Water</b> <b>(in afa)</b>					
	<b>Alternative</b>				
<b>Use</b>	<b>No Action</b>	<b>Settlement Alternative</b>	<b>Non Settlement Alternative 1</b>	<b>Non Settlement Alternative 2</b>	<b>Non Settlement Alternative 3</b>
Municipal and Industrial <sup>(a)</sup>	0	0	0	13,500	13,500
<b>Total</b>	0	0	0	13,500	13,500
<b>Note:</b> (a) Municipal and industrial uses could include approximately 4,000 afa of CAP water for use in the slurryline operation originating at the Black Mesa Coal Mine on the Navajo Reservation.					

### **L.II.b.2. Facilities**

For purposes of this analysis, it is assumed the CAP allocations would most likely be diverted out of Lake Powell and delivered to end users through one or more proposed pipelines. Two currently under consideration are the Western Pipeline and the Lake Powell Pipeline, whose alignments are shown in Figure L-IND-4. Certain institutional arrangements would be required to divert CAP water out of Lake Powell.

The proposed Western Pipeline could provide water to Communities located in the general vicinity of Highway 89 from Bitter Springs to Cameron, including the Communities of Coppermine, Cedar Ridge, Bodaway, and Gap. Assuming a 100-foot construction right-of-way, approximately 1,100 acres would be impacted by the construction of the Western pipeline.

The Lake Powell Pipeline would supply water for the slurryline operation which transports coal from the Black Mesa Coal Mine to the Mojave Generating Station in Laughlin, Nevada. It could also provide water to Communities located in the general vicinity of Tuba City and throughout the Hopi Reservation. Assuming a 100-foot construction right-of-way, approximately 2,000 acres would be impacted by the construction of the main trunkline of the Lake Powell Pipeline.



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**CAP Allocation Draft EIS  
General Location Map  
Hopi Tribe and Navajo Nation**

**Figure #L-IND-4**

Additional land would be disturbed from any distribution lines that would be constructed off the main pipelines, and for other construction-related activities.

Water diversions from Lake Powell, which is located within the Upper Basin, would require additional approvals for water from this diversion to be used for Lower Basin uses.

## **II.C. Population Projection**

### **II.C.1. Hopi Tribe**

The estimated 2001 population level for the Hopi Tribe is 8,237<sup>3</sup> and the estimated 2051 population level 13,427. The population is expected to grow by approximately 63 percent over the 50-year study contract period (i.e., 2001-2051).

### **II.C.2. Navajo Nation**

The estimated 2001 population level for the Navajo Nation within Arizona is 62,077<sup>4</sup> and the 2051 population level is estimated to be 100,893. The population is expected to grow by approximately 63 percent over the 50-year CAP contract period (i.e., 2001-2051). The estimated 2001 population level for the lower basin portion of the Navajo Nation is 22,544 and the estimated 2051 population level is 36,788. The CAP allocation would be used in the lower basin portion of the Navajo Nation.

## **II.D. Environmental Effects**

The following discussion provides some general information regarding these probable construction projects and provides a general identification of potential environmental impacts and potential mitigation measures.

### **II.D.1. Land Use**

#### **II.D.1.a. Hopi Tribe**

There are twelve Hopi villages and several small residential areas along the Arizona Highway 264 corridor. The villages range in size from 180 people to 1,418. Gift shops, trading posts, and service stations are located in the villages and at other points along the highway.

The land surrounding the Hopi villages is used for farming, grazing, subsistence gathering, and religious purposes. Lands further from the villages are used primarily for grazing, but also support uses such as seasonal homes, limited farming, gathering, and recreation. Gathering is an important land use. Hopis gather pinyon nuts and firewood; yucca for baskets; building

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<sup>3</sup> The population figures cited here are from ADES. They do not agree with United States estimates for current or projected population.

<sup>4</sup> As noted in the introduction to the Appendix, the population figures used for all entities in the Draft EIS are from ADES; however, according to the Navajo Division of Community Development, in 1997 the Navajo population of the Reservation was 172,399. The ADES figures are also significantly below U.S. population estimates.

stone; sand and rock for mixing concrete, and clay, sheep manure, and mineral colors for making pottery.

#### **II.D.1.b. Navajo Tribe**

The major population centers on the Navajo Reservation include Kayenta, Chinle, Many Farms, Shiprock, Tuba City, Leupp, Cameron, Ganado, and Window Rock. A large percentage of the population lives in traditional hogans in widely scattered settlements. The land uses include agriculture, grazing, forestry, and mining. The major mineral resources include coal, uranium, and petroleum.

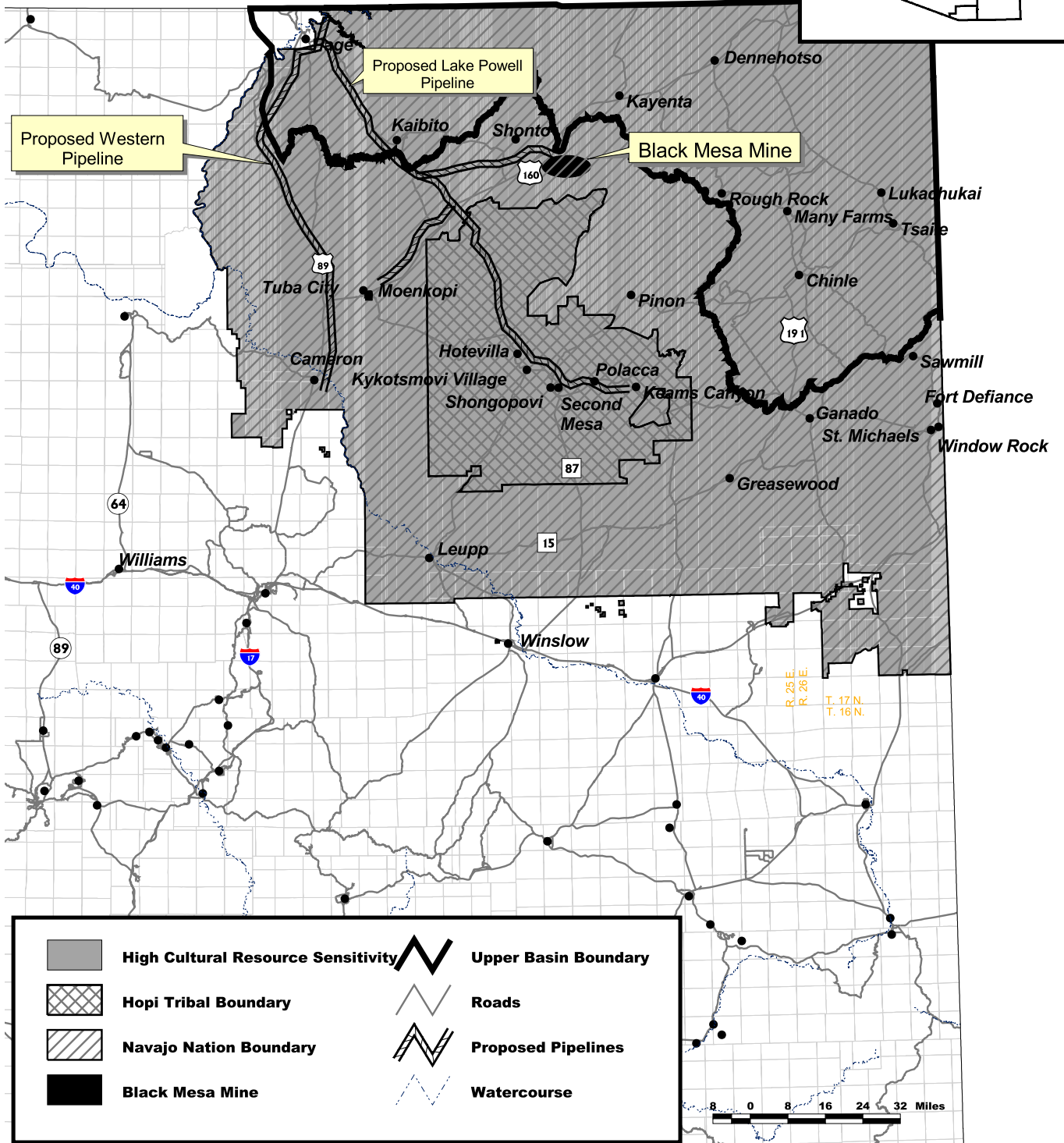
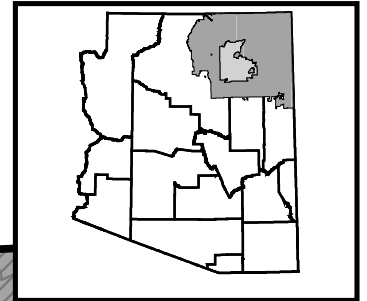
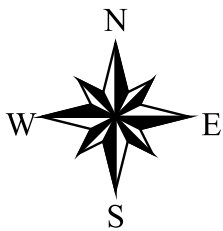
#### **II.D.2. Archaeological Resources**

##### **II.D.2.a. Hopi Tribe**

Cultural deposits dating to the Paleoindian and Archaic periods have been documented in the vicinity of the Hopi Reservation (Gumerman 1966). Basketmaker and Puebloan occupations also are known; during the later Puebloan periods, Western Anasazi groups aggregated in a few locations—including Hopi—and large villages were established on the Hopi Mesas (e.g., Walpi, Awatovi, Kawaika'a, Kiskakovi, Sikiatki, Old Mishongnovi, Old Shongopovi, Oraibi, Chacpahu, Chuckovi, Kuchaptuvela) (Cordell 1997; Upham 1982). Although some of these sites had been abandoned by the mid-1500s, some are still in use. Other site types that might occur throughout the area's occupational sequence include artifact scatters, farms, trails, rockshelters, isolated features, petroglyphs, cairns, shrines, coal and salt mines, and agricultural fields (Adams 1981; Ahlstrom and Hays 1991). The Hopi Tribe has a Cultural Resource Division. Cultural resource sensitivity areas in this entity are shown in Figure L-IND-5. Based on the limited data used to generate the cultural sensitivity designations, the potential for cultural resource impacts in this entity is high.

##### **II.D.2.b. Navajo Nation**

The human occupation of northeastern Arizona dates to the Paleoindian period; Paleoindian and Archaic components and isolated finds have been documented throughout the Navajo territory (e.g., Ayres 1966; Nichols and Smiley 1985; Peckham and Wilson 1967; Vogler et al. 1993). Ceramic period sites are primarily affiliated with the Anasazi cultural tradition; resource types include Basketmaker cave and rockshelter sites, early pit house villages, and aggregated Puebloan Communities characterized by great kivas, specialized activity areas, and associated agricultural features (e.g., Black Mesa). Important early Protohistoric site types include defensive pueblitos, dating to the Pueblo Revolt of 1680, which document Navajo-Puebloan interaction; dwellings; trails; resource procurement and processing loci; and other limited activity sites. Historic resources include mining and herding camps, roads, and shrines. The Navajo Nation has an independently acting Tribal Historic Preservation Officer (THPO) who should be consulted regarding any proposed undertaking that could potentially affect cultural resources within Navajo lands. Cultural resource sensitivity areas in this entity are shown in Figure L-IND-5. Based on the limited data used to generate the cultural sensitivity designations, the potential for cultural resource impacts in this entity is high.



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# **CAP Allocation Draft EIS** **Cultural Resources** **Hopi Tribe and Navajo Nation**

Figure #L-IND-5

**II.D.2.c. Impacts**

Pipeline construction as well as associated activities such as borrow sites, spoil areas, construction yards, equipment storage, and field offices have the potential to impact historic and archaeological sites. Section 106 compliance, including consultation with the affected Tribes would be carried out to identify significant sites and develop a plan to mitigate or avoid them.

**II.D.3. Biological Resources****II.D.3.a. Existing Habitat**

This large area is composed of mainly sedimentary soils that support many vegetation associations. In terms of broad biotic Communities, these include Great Basin Conifer Woodland (122.4), Plains and Great Basin Grassland (142.1), and Great Basin Desertscrub (152.1). At higher elevations within the Chuska Mountains (Navajo Nation), there is Petrane Montane Conifer Forest (122.3), Petrane Subalpine Conifer Forest (121.3), and Subalpine Grassland (141.4). Specialized niches and soil types, such as riparian corridors, springs, saline seeps, rock faces, sand dunes, and gypsiferous substrates, support numerous rare species.

**II.D.3.b. Impacts to Biological Resources**

Additional acreage to accommodate the M&I growth within this planning area over the 50-year study period has not been estimated, but the pipelines associated with this allocation will result in loss of an estimated 3,100 acres of natural habitat. Lake Powell pipeline will be an estimated 165 miles long and disturbance of 100 feet wide creating an impact of approximately 2,000 acres, and the west pipeline will be an estimated 90 miles long and disturbance of 100 feet wide creating an impact of approximately 1,100 acres. With regard to biological resources, only Non-Settlement Alternatives 2 and 3 have impacts.

**II.D.3.c. Summary of Possible Impact to T&E Species**

These Tribal entities are located within Coconino and Navajo County for which there are 20 T&E species listed by USFWS. Any number of these species or their habitat might be affected. However, the extent of the possible impacts can only be fully assessed when site-specific development plans are available. In order for Reclamation to comply with Section 7 of the EASA, detailed species surveys of the potentially suitable habitat would be required. Based on the results of these surveys, Reclamation will consult with USFWS.

**II.D.4. Water Resources**

Groundwater supplies essentially all of the domestic water needs of the population in the area. It also supplies the industrial needs, with the largest need being for a coal slurry pipeline for the Black Mesa Mine. The TDS concentration of local groundwater is generally less than 750 mg/l.

The analysis of impacts for the Navajo and Hopi Reservations was performed on a qualitative rather than a quantitative basis. It considers the potential change in groundwater storage (rather than groundwater levels) in the N-Aquifer in the Black Mesa area, which underlies both



Tribes. While the potential amount of CAP water available to both the Navajo and Hopi Tribes is known to be 13,500 afa for Non-Settlement Alternatives 2, 3A, and 3B, the distribution of that water between the two Tribes is contingent on resolution of issues outside the scope of this EIS. Therefore, this discussion of water resources applies to both tribes.

Under the No Action Alternative, Settlement Alternative, and Non-Settlement Alternative 1, ongoing pumping from the N-Aquifer withdrawals would be greatest near the centers of pumping. This would include the Peabody mining complex and the communities of Kayenta, Pinon, Polacca, Shonto and Moenkopi. It is likely that future drawdowns in certain local areas will be substantial and could impair the ability to recover groundwater using existing wells.

The allocation of CAP water under Non-Settlement Alternatives 2, 3A and 3B would result in a reduction in groundwater pumping (as compared to the No Action Alternative) of 675,000 af over the 50-year period. This would result in an incremental increase in groundwater storage relative to the No Action Alternative of 675,000 af, or about 0.23 to 0.38 percent of the estimated overall N-Aquifer storage. The increased groundwater storage would result in higher average groundwater levels overall in the N-Aquifer for these alternatives relative to the No Action Alternative. However, evaluation of local impacts is outside the scope of this EIS, and the improvement in overall N-Aquifer storage may not translate into significant improvements in groundwater levels for all local areas that experience substantial drawdowns under the No Action Alternative.

Subsidence would not be anticipated due to changes in groundwater levels in consolidated sedimentary rocks, like the N-Aquifer.

#### **II.D.5. Socioeconomic**

Under Non-Settlement Alternatives 2 and 3a and 3b, the Navajo and Hopi Nations would be allocated 13,500 af of CAP water. A portion of the allocation of CAP water to the Navajo and Hopi Nations would provide a renewable source of surface water for coal mining and other M&I purposes. The Navajos and Hopis sell coal to the Navajo Generating Station in northern Arizona and to the Mohave Power Plant in southern Nevada. Royalties and fees associated with coal mining and operation of electric power plants are important sources of income for both Nations. In addition to potential economic growth, the CAP allocation would provide a reliable potable water supply for many Tribal members living on the Navajo and Hopi Reservations who currently do not have a reliable potable water supply for domestic use.

A source of funding for construction of two pipelines to deliver the CAP water to the Navajo and Hopi Nations has not been identified and is beyond the scope of this analysis. Nevertheless, if constructed, the estimated cost of the two pipelines is \$136.5 million at 1995 price levels.<sup>5</sup> Planning and construction of one pipeline, known as the Lake Powell Pipeline, is projected to require seven years. Planning and construction of the second pipeline, known as the Western Pipeline, is projected to require 5 years.

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<sup>5</sup> The source of this estimate is a Department of the Interior appraisal level study dated August 1999.

The direct construction expenditures, for the purposes of this analysis are based on a range of from \$125 to \$150 million, are projected to employ 1,279 persons over the five-to-seven year construction schedule. Total employment, including indirect and induced impacts, is projected to be 2,260 persons over the construction schedule. The employment impacts would occur mainly in Coconino and Navajo Counties. Total output impact is projected to be \$201.5 million. The total projected impact to income is \$75.5 million.

The employment and income stimulated by the CAP allocation and construction of the two pipelines may improve the standard of living for residents of the Navajo and Hopi Reservations. Income and unemployment statistics are provided in Tables L-Indian-11 and L-Indian-12.

<b>Table L-Indian-11</b> <b>CAP Allocation Draft EIS</b> <b>Income Statistics for Hopi Tribe</b>	
<b>Type of Income</b>	<b>Hopi Tribe</b>
Median Household Income	\$14,325
Per Capita Income (Poverty Status)	\$ 4,953
Persons Below Poverty	48%
Families Below Poverty	53%
Female Households, Families Below Poverty	52%
Households with Public Assistance Income	23%

Source: Bureau of the Census, 1990 Population and Housing Statistics

<b>Table L-Indian-12</b> <b>CAP Allocation Draft EIS</b> <b>Income Statistics for Navajo Nation</b>	
<b>Type of Income</b>	<b>Navajo Nation</b>
Median Household Income	\$12,817
Per Capita Income (Poverty Status)	\$ 4,788
Persons Below Poverty	49%
Families Below Poverty	47%
Female Households, Families Below Poverty	52%
Households with Public Assistance Income	33%

Source: Bureau of the Census, 1990 Population and Housing Statistics